

1. Parametrize and give bounds for the portion of the paraboloid  $z = x^2 + y^2$  lying above the rectangle with vertices  $(0,0)$ ,  $(2,0)$ ,  $(2,3)$ , and  $(0,3)$ .
2. Parametrize and give bounds for the portion of the cylinder with radius 4 centered around the  $z$ -axis between  $z = 2$  and  $z = 10$ .
3. Parametrize and give bounds for the portion of the plane  $z = 12$  that lies within the cylinder with equation  $x^2 + y^2 = 16$ .

